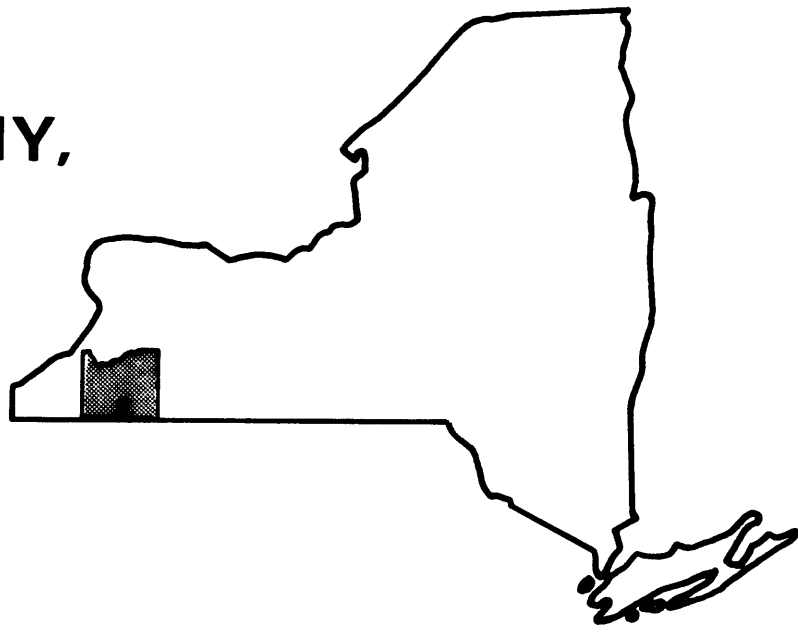
# FLOOD INSURANCE STUDY

# VILLAGE OF ALLEGANY, NEW YORK
## CATTARAUGUS COUNTY



REVISED:
DECEMBER 17, 1991

Federal Emergency Management Agency

COMMUNITY NUMBER - 360967

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial FIS Effective Date: FIS report - October 1977/
Flood Insurance Rate Map - April 17, 1978

Revised FIS Date: December 17, 1991

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# 1.0 INTRODUCTION

## 1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Village of Allegany, Cattaraugus County, New York. This information will be used by the Village of Allegany to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

## 1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

For the original study, the hydrologic and hydraulic analyses were prepared by the New York State Department of Environmental Conservation (NYSDEC) for the Federal Emergency Management Agency (FEMA), under Contract No. H-3856. That work was completed in October 1976.

For this revised study, hydraulic analyses were prepared by the Soil Conservation Service (SCS). This work was completed in September 1990.

## 1.3 Coordination

On August 26, 1975 an initial Consultation Coordination Officer's (CCO) meeting was held with representatives of FEMA, the Villages of Allegany, Portville and Ellicottville, the Cattaraugus County Planning Board, the Towns of Allegany, Portville and Salamanca, the NYSDEC (the study contractor), the Army Corps of Engineers (COE) and the SCS in order to determine the streams to be studied by detailed methods in the original study.

On February 16, 1977, the final CCO meeting was held with representatives of the Village of Allegany, FEMA and NYSDEC in order to review the results of the original study.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Allegany. The area of study is shown on the Vicinity Map (Figure 1).

The limits of detailed study in the Village of Allegany were determined by FEMA after consultation with community representatives and the study contractor. For the original study, the areas studied by detailed methods were Fivemile Creek and the Allegheny River. In this revision, Fivemile Creek was restudied from the downstream corporate limits to the upstream corporate limits. The Allegheny River forms the southern boundary of the village for a distance of 2,540 feet and its tributary, Fivemile Creek, forms the western boundary for a distance of approximately 1,400 feet.

Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the Flood Insurance Rate Map (Exhibit 2). The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

An unnamed tributary to Fivemile Creek was studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Village of Allegany.

### 2.2 Community Description

The Village of Allegany is located in the southeastern part of Cattaraugus County, in the extreme western region of New York State. The Village of Allegany is surrounded on all sides by the Town of Allegany. The village has an area of 0.5 square mile. The population of the village was 2,050 according to the 1970 census, a decrease of 14 persons from the 1960 census (Reference 1). The Allegheny River begins in Pennsylvania and flows in a large loop through southwestern New York State. The river returns to Pennsylvania and joins the Monongahela River at Pittsburgh to form the Ohio River. Fivemile Creek begins in the Town of Ischua

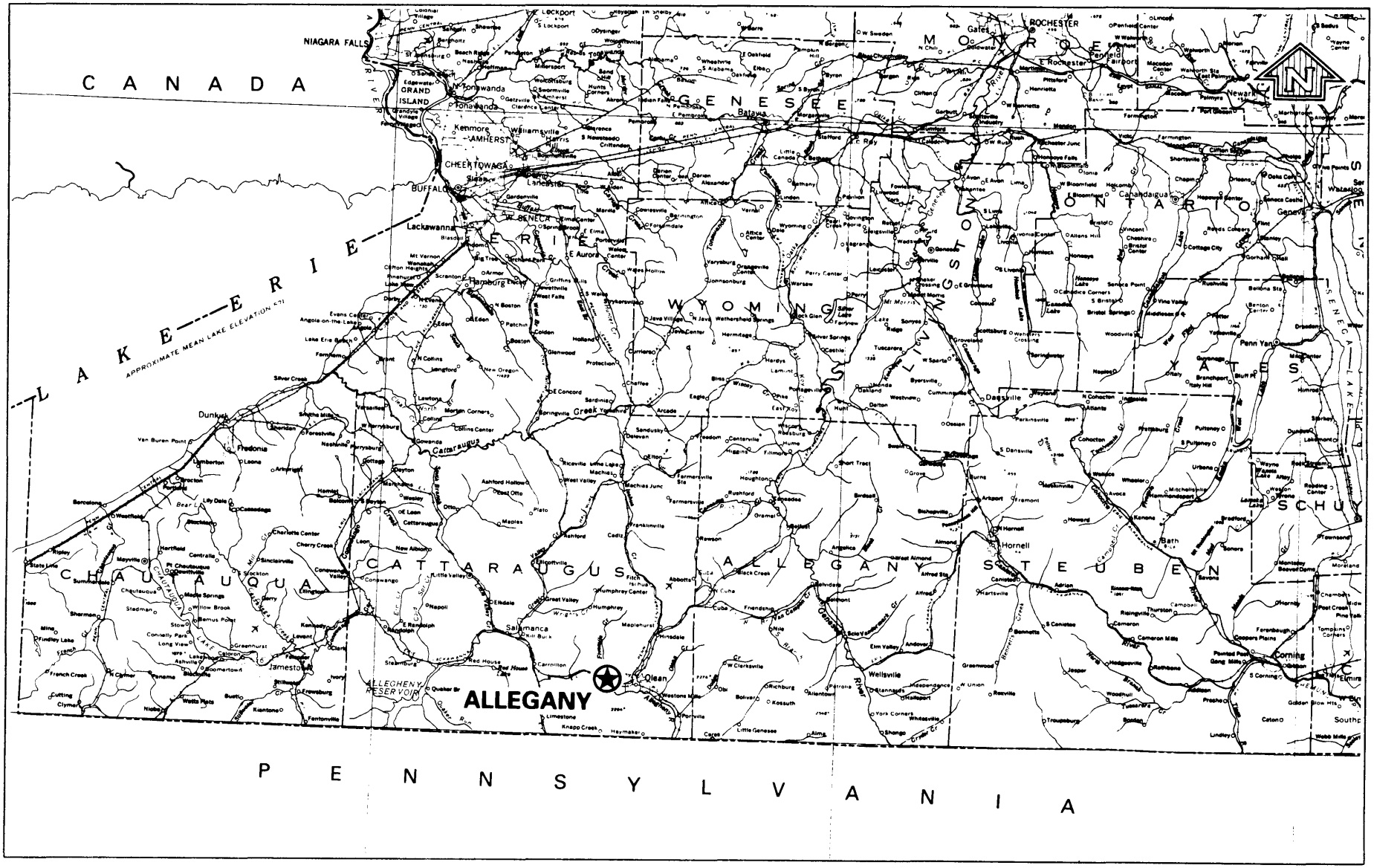



FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

# VILLAGE OF ALLEGANY, NY

(CATTARAUGUS CO.)

APPROXIMATE SCALE

16 0 16 32 48 MILES

## VICINITY MAP

approximately 10 miles north of the Village of Allegany. It flows south through the Towns of Humphrey and Allegany in a wide flat valley to join the Allegheny River southwest of the village.

Average annual temperature in the region is 46°F with average temperatures of 23°F in January and 70°F in July. Precipitation averages 39 inches per year (Reference 2).

The community is fairly flat with an average elevation of 1,460 feet above the National Geodetic Vertical Datum of 1929 (NGVD). Maturely dissected plateaus designated as the Northwestern Appalachian Plateau Border and the Allegheny compose the physiography of the area. Soils range from a gravelly loam to clay but are predominantly silty loam. Vegetation in the area consists of original, second and third growth forests of Yellow Birch, Beech, and Hard Maple.

Commercial and residential areas are located in the floodplain. Low land immediately adjacent to the streams is brush covered and unused. The area between the Allegheny River and Conrail and between Fivemile Creek and Second Street has been subject to periodic flooding.

## 2.3 Principal Flood Problems

Low-lying areas in Allegany are subject to periodic flooding caused by overflow of the Allegheny River and Fivemile Creek. The most frequent floods in the study area result from heavy rainfall in the winter and early spring usually in combination with snow melt. Structures on Union Street and First Street have been damaged by flooding (Reference 3). Large flood flows due to heavy storms have also occurred at other times. The largest flood flow on the Allegheny River recorded at the gaging station at Olean, New York was in June 1972 (Tropical Storm Agnes) with a flow of 59,000 cubic feet per second (cfs) and with a recurrence interval of approximately 200 years (Reference 4). Listed below is a brief tabulation of other major floods with estimated frequencies (Reference 3):

| Date | Order of Magnitude | Elevation (Stage) (NGVD) | Flow (cfs) | Approximate Frequency (Estimated) in yrs. |
|---|---|---|---|---|
| July 19, 1942 | 2 | 1415.2 | 44,000 | 65 |
| March 9, 1956 | 3 | 1412.5 | 31,000 | 18 |
| May 29, 1946 | 4 | 1412.4 | 30,000 | 17 |
| September 29, 1967 | 5 | 1412.2 | 29,400 | 16 |

Photographs showing flooding conditions in the Village of Allegany during the flood of June 1972 are shown in Figures 2 and 3.

### 2.4 Flood Protection Measures

There is no existing flood protection structure in the study area. However, the COE has proposed construction of a few thousand feet of earth dike along the left bank of Fivemile Creek. The Pittsburgh District COE placed this project on an "inactive Civil Projects List" as of January 1976. Allegany also receives flood warnings when flood peak forecasts are issued from the Olean Flood Control System.

## 3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

### 3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

On the Allegheny River, the peak discharge-frequency relationship was based primarily on a statistical analysis of the stage and discharge records of gaging stations near the City of Olean just

FIGURE 2: Allegheny River across right center, Fivemile Creek across bottom, looking east (Allegany Village, 1972 Tropical Storm Agnes Flood).

FIGURE 3: Allegheny River across extreme left, Fivemile Creek across top of picture, looking west (Allegany Village, 1972 Tropical Storm Agnes Flood).

upstream from the village (Reference 5). The gaging station at the Water Treatment Plant of the City of Olean was established in 1942 and is maintained by the city. The rating curve for this gage was developed by the U. S. Weather Bureau River Forecast Service. The statistical procedures used in this analysis are those proposed by Leo R. Beard which use a log-Pearson Type III distribution as a base method for flood flow frequency studies (Reference 6). This methodology conforms with the uniform techniques for determining flood flow frequencies as set forth by the Hydrology Committee of the United States Water Resources Council (Reference 7).

For Fivemile Creek, a synthetic rainfall-runoff relationship method, based on a dimensionless unit hydrograph, was used to develop flood flow-frequency relationships. The 24-hour rainfall amounts for frequencies up to 100 years, as obtained from the Rainfall Frequency Atlas of the United States (Reference 8), were plotted on log-normal paper and the rainfall amount for the 500-year frequency was extrapolated from the resulting graph.

The drainage area of each stream was divided into subareas to evaluate the hydrologic effects of as many tributaries as would be significant.

The computer program TR-20, (Reference 9), developed by the SCS was used to compute surface runoff. It takes into account conditions affecting runoff such as land use, type of soil, shape and slope of watershed, antecedent moisture condition, etc. It develops a hydrograph and routes the hydrograph through stream channels and reservoirs. The program is designed to combine the routed hydrograph with those from other tributaries and print out the total composite hydrograph peak discharges, and times of occurrence at each desired point in the watershed for each storm evaluated. From this data frequency discharge-drainage area curves were plotted for each elevation point. A Summary of Discharges is shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-YEAR | 50-YEAR | 100-YEAR | 500-YEAR |
|---|---|---|---|---|---|
| ALLEGHENY RIVER | | | | | |
| At upstream corporate limits | 1,169 | 26,300 | 41,000 | 49,000 | 72,000 |
| FIVEMILE CREEK | | | | | |
| At downstream corporate limits | 37.29 | 1,752 | 2,722 | 3,057 | 3,990 |

### 3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section data for streams in the area were obtained by field survey. All bridges and culverts were surveyed to obtain elevation data and structural geometry in order to compute the significant backwater effects of these structures. Cross sections were located at close intervals above and below bridges, at control sections along the stream length, and at significant changes in ground relief, land use, or land cover. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Channel roughness factors (Manning's "n") for the Allegheny River were assigned based on field inspections and ground level photographs, which were compared with U. S. Geological Survey calibrated photographs considering channel conditions, overbank vegetation, and land use (Reference 10). Channel roughness factors for Fivemile Creek were based on field inspection and the National Engineering Handbook Section 5, Supplement B (Reference 11). Consideration was given to channel composition, surface irregularities, characteristics of obstructions, vegetation, and meandering of the stream. The channel "n" value for Fivemile Creek and the Allegheny River was 0.055, and the overbank "n" values ranged from 0.065 to 0.075.

Water-surface elevations on the Allegheny River for floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 12). Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals.

Distance references used in the computer backwater analysis of the Allegheny River were based on the COE mile marker system. As a result there are discrepancies in lengths appearing in the computer output and the correct distances that appear on the mapping and profiles in this respect. This level of accuracy is consistent with the general method of calculations used in the backwater determinations and the low energy differential occurring along reaches under analysis.

Flood profiles on Fivemile Creek were calculated using the SCS WSP-2 Water-Surface Profiles Computer Program (Reference 13). This program used the standard step method, with some modifications, to compute profiles between valley sections. All profiles are computed in the upstream direction. Therefore, only subcritical flow, a condition normally characteristic of natural streams, can be analyzed. For any super-critical flows encountered, the program will assume critical depth and resume computations. At any one road restriction, WSP-2 can compute head losses through one bridge opening or up to five culvert openings with different configuration. Profiles were computed on the assumption that the bridge and culvert openings would remain unobstructed.

Reach lengths for the channel were measured along the centerline of channel between sections and overbank reach lengths were measured along the approximate centerline of the effective out-of-channel flow area.

Starting water-surface elevations on the Allegheny River were supplied by the COE (Reference 14). Starting water-surface elevations for Fivemile Creek were taken from water-surface elevations for the Allegheny River.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study, and their descriptions, are shown on the maps.

## 4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

### 4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1"=400' with a contour interval of 5 feet (Reference 15).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundaries correspond to the boundaries of the areas of special flood hazard (Zones A and AE), and the 500-year floodplain boundaries correspond to the boundaries of areas of moderate flood

hazard. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundaries have been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2).

## 4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this study was computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. The floodway presented for Fivemile Creek was computed using "HUD-15" Computer Program (Reference 16). Where special topographic features required it, the floodway was adjusted more toward one side of the stream as necessary. The results of the floodway computations are tabulated for selected cross sections (Table 2). Part of the Allegheny River and Fivemile Creek floodways lie outside the corporate limits and in the Town of Allegany.

The computed floodway is shown on the Flood Insurance Rate Map (Exhibit 2). Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

| FLOODING SOURCE | | FLOODWAY | | | BASE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE | WIDTH[3] (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| | | | | | (FEET NGVD | | | |
| Allegheny River | | | | | | | | |
| A | 3,656[1] | 995 | 15,360 | 3.19 | 1,416.7 | 1,416.7 | 1,417.7 | 1.0 |
| Fivemile Creek | | | | | | | | |
| A | 1,450[2] | 291 | 2,410.1 | 1.60 | 1,415.6 | 1,415.6 | 1,416.5 | 0.9 |
| B | 1,575[2] | 140 | 1,543.8 | 2.16 | 1,415.7 | 1,415.7 | 1,416.6 | 0.9 |
| C | 2,485[2] | 371 | 2,481.2 | 1.43 | 1,415.9 | 1,415.9 | 1,416.8 | 0.9 |

[1]Feet above confluence of Fivemile Creek
[2]Feet above confluence with Allegheny River
[3]This width extends beyond the corporate limits

TABLE 2

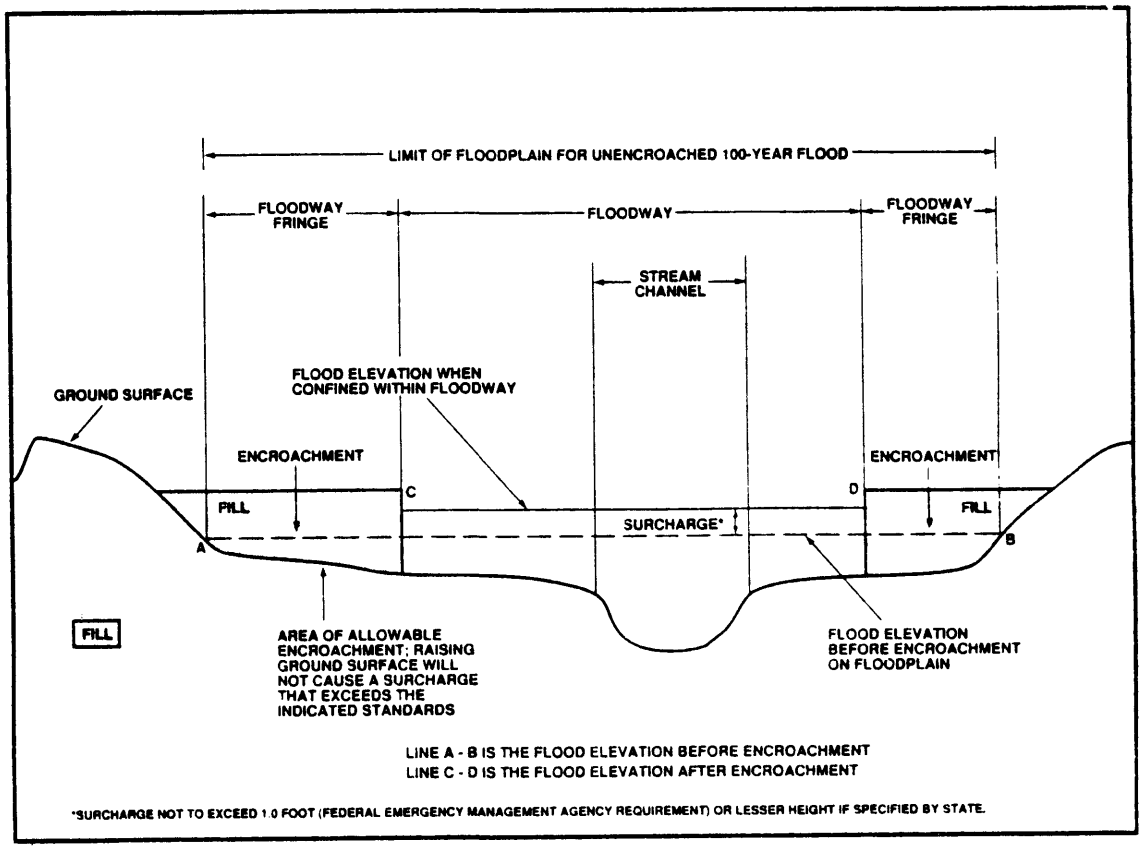
FEDERAL EMERGENCY MANAGEMENT AGENCY

**VILLAGE OF ALLEGANY, NY**
**(CATTARAUGUS CO.)**

**FLOODWAY DATA**

**ALLEGHENY RIVER AND FIVEMILE CREEK**

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.




**FLOODWAY SCHEMATIC** Figure 4

## 5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

## 6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map (FIRM) is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable. The FIRM includes flood hazard information that was presented separately on the Flood Boundary and Floodway Map in the previously printed Flood Insurance Study for the Village of Allegany.

## 7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the Town of Allegany (Reference 17).

Because it is based on more up-to-date analyses, this Flood Insurance Study supersedes the previously printed Flood Insurance Study for the Village of Allegany (Reference 18).

## 8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, 26 Federal Plaza, Room 1351, New York, New York 10278.

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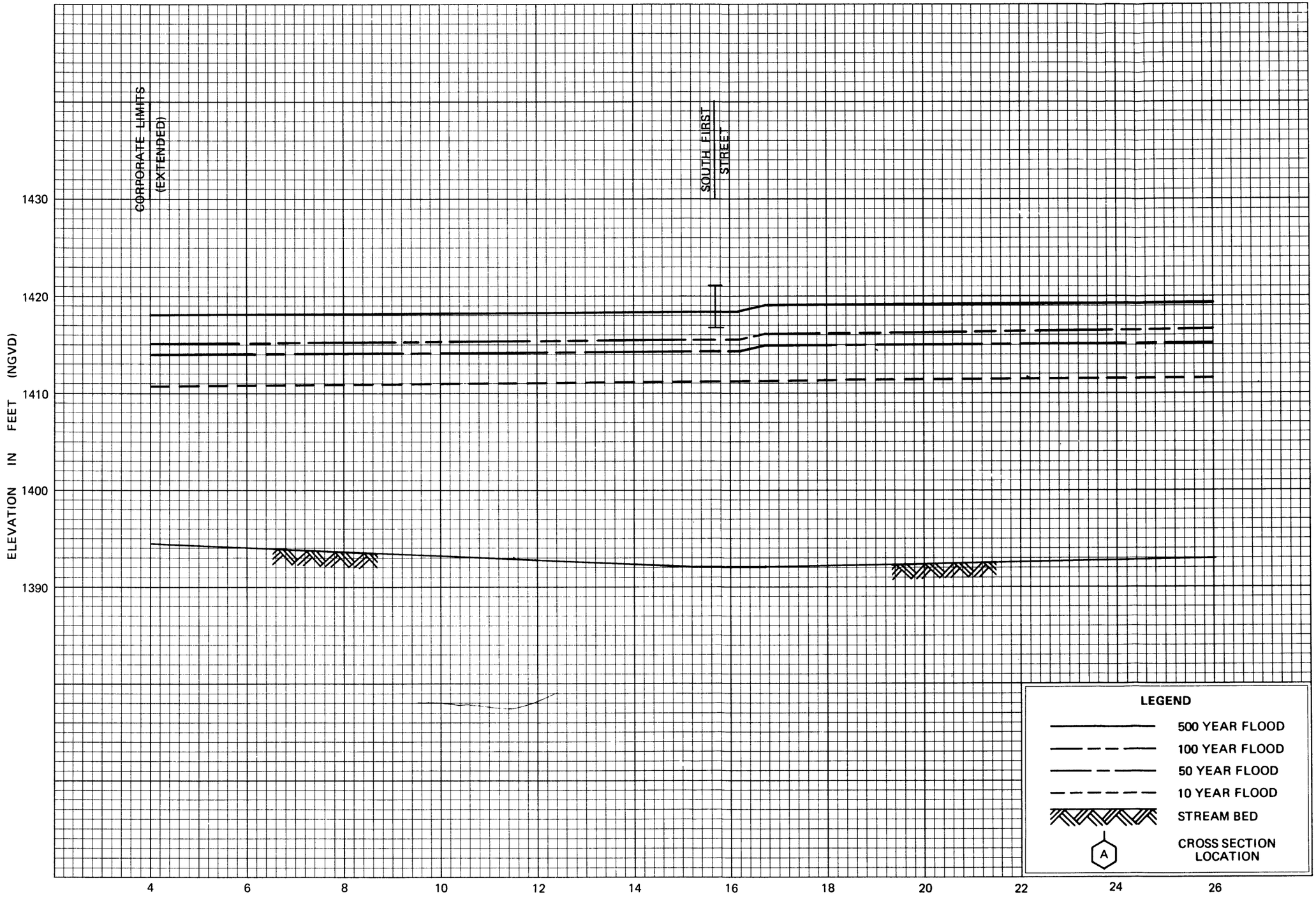



**FLOOD PROFILES**

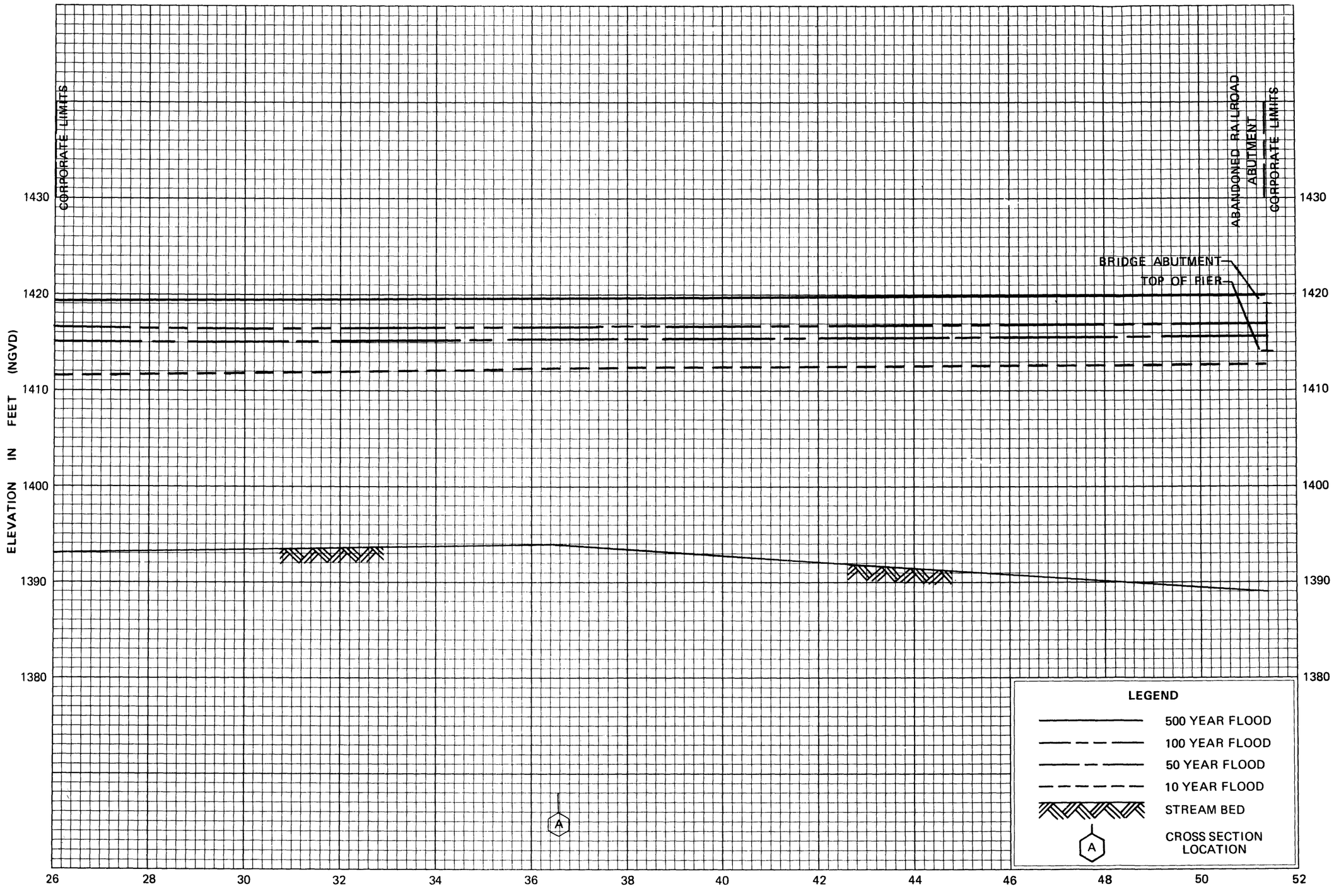
**ALLEGHENY RIVER**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**VILLAGE OF ALLEGANY, NY**

(CATTARAUGUS CO.)

**01P**



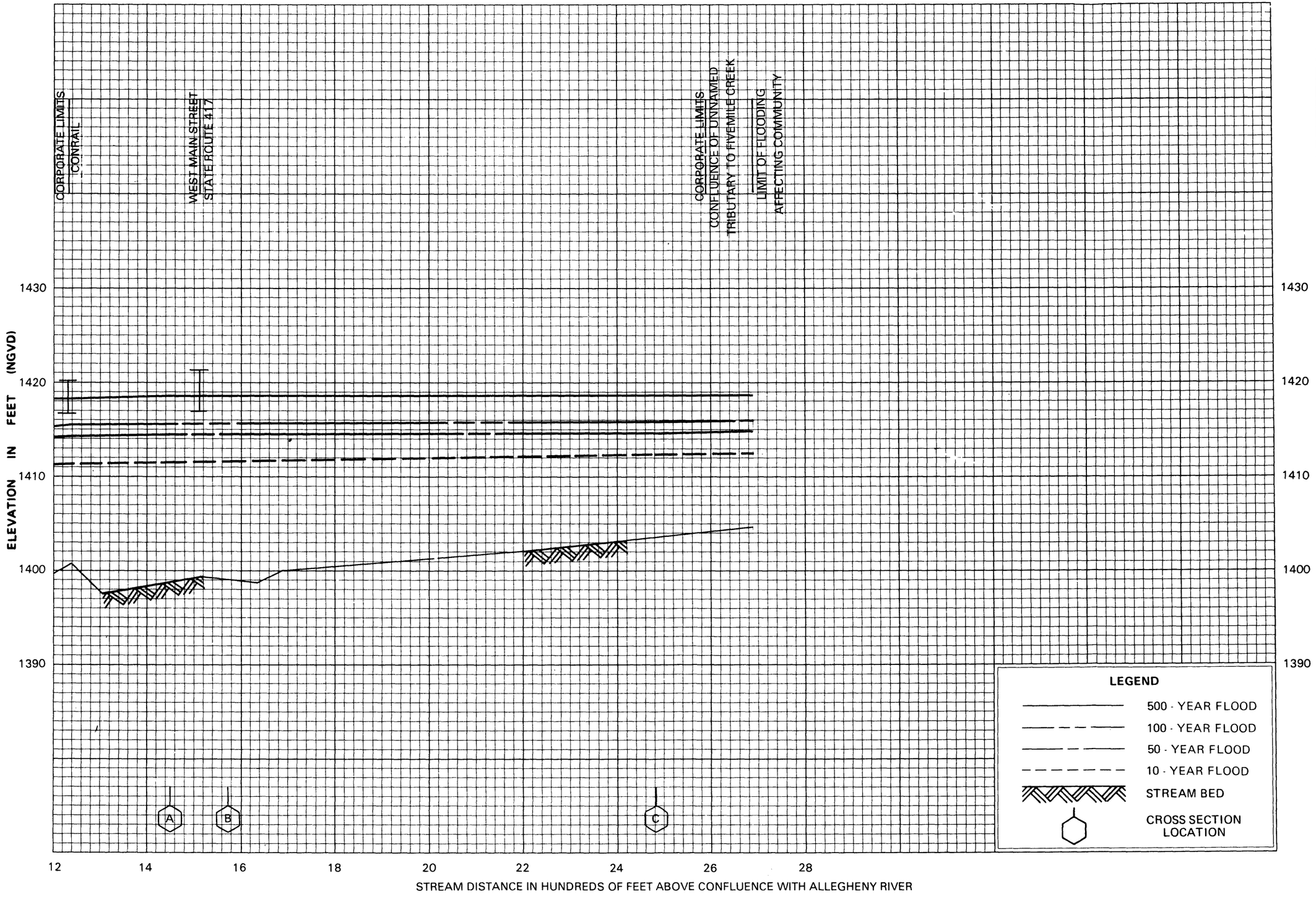

**FLOOD PROFILES**

**ALLEGHENY RIVER**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**VILLAGE OF ALLEGANY, NY**
(CATTARAUGUS CO.)

**02P**




# FLOOD PROFILES

## FIVEMILE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**VILLAGE OF ALLEGANY, NY**

(CATTARAUGUS CO.)

**03P**